For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

TRANSLATING DOOR WITH DISENGAGEABLE SEALS

Background of the Invention

Field of the Invention

The subject invention generally pertains to what is known as a horizontally sliding door and more specifically to a seal for such a door.

Description of Related Art

So-called horizontally sliding doors (which actually may slide or roll) usually include one or more door panels that are suspended by carriages that travel along an overhead track. The carriages allow the door panels to slide or roll in a generally horizontal direction in front of a doorway to open and close the door. The movement of the panels can be powered or manually operated. Depending on the width of the doorway and the space along either side of it, a sliding door can assume a variety of configurations.

For a relatively narrow doorway with adequate space alongside to receive an opening door panel, a single door panel is enough to cover the doorway. Wider doorways with limited side space may require a bi-parting sliding door that includes at least two panels each moving in opposite directions from either side of the doorway and meeting at the center of the doorway to close the door. For even wider doorways or those with even less side space, multi-panel sliding doors can be used. Multi-panel doors have at least two parallel door panels that overlay each other at one side of the doorway when the door is open. To close the door, one panel slides out from behind the other as both panels move in front of the doorway to cover a span of about twice the width of a single panel. Applying such an arrangement to both sides of the doorway provides a bi-parting door with multiple panels on each side.

Although sliding door are used in a wide variety of applications, they are often used to provide access to cold-storage lockers, which are rooms that provide large-scale refrigerated storage for the food industry. Doorways into such a room are often rather wide to allow forklift trucks to quickly move large quantities of products in and out of the room. The sliding doors are usually power actuated for minimizing

the time in which the door is open for the forklift, thus minimizing the amount of cool air that can escape when the door is open. Error! Main Document Only.
To further minimize the cooling load of the room, the door panels should be thermally insulated and completely sealed around their entire perimeter.

However a tightly sealed door can create frictional drag against mating sealing surfaces as the door opens and closes. Frictional drag can slow the operation of the door and can also create abrasive wear on the sealing surfaces. Unfortunately, increasing the hardness and wear resistance of the seal typically reduces its ability to flex and conform to its mating sealing surface, thus reducing its ability to seal. On the other hand, making a seal relatively soft and compliant may improve its ability to seal, but often reduces its wear resistance.

For effective sealing, mating seals need to be properly aligned to each other. This is done by properly aligning the door panels that move the seals into position. Unfortunately, it is not uncommon for a forklift or other vehicles to accidentally crash through a closed door. This obviously dislodges the alignment of the door panels and often disengages the seals in an abnormal direction. Separating seals in this manner often involves extreme deformation of the seals. If the panels can not be readily realigned or the seals do not recover their original shape after the impact, the seal=s ability to seal diminishes.

Summary of the Invention

In order to effectively seal a sliding door, a door panel is provided with a seal that includes a lip that overlaps a mating seal. The seals are sufficiently rigid to help keep the door panel properly positioned, yet are sufficiently compressible and resilient to provide effective sealing, even after being temporarily deformed by an impact.

In some embodiments, an upper edge seal, a lower edge seal, a leading edge seal and a trailing edge seal are disposed about a perimeter of a sliding door panel and together the seals alternately engage and disengage various sealing surfaces as the door panel respectively closes and opens.

In some embodiments, a corner seal provides a continuous seal at an intersection between an upper edge seal and a trailing edge seal of a door panel.

In some embodiments, a sliding door includes mating seals whose compliance and geometry accommodate their misalignment by providing a compressive force between the seals in a direction outside the plane along which the panel moves. This compressive force may either help properly align the seals, or may be used to enhance the sealing itself.

In some embodiments, a sliding door panel rotates slightly about a generally horizontal axis to pivot a lower edge seal of the panel away from a lower sealing surface as the panel translates from a closed position to an open position.

In some embodiments, a sliding restraint system is included to provide gross positioning/guiding of the panels, and to improve the door=s ability to readily recover from an impact.

Brief Description of the Drawings

Figure 1 is a front view of a mult-panel, bi-parting sliding door in an open position.

Figure 2 is a front view of the embodiment of Figure 1, but with the door between its fully open and fully closed positions. Part of the left side of the door is cut away to show sectional views of its seals.

Figure 3 is a front view of the embodiment of Figure 1, but with the door in its closed position and part of the left side of the door cut away to show its seals engaged.

Figure 4 is a top view of the embodiment of Figure 1 with the door fully open, but with the track and some other details omitted for clarity.

Figure 5 is a top view similar to that of Figure 4, but showing the door partially open and moving to its closed position.

Figure 6 is an end view of two seals in one position.

Figure 7 is an end view of the seals of Figure 6, but in another position.

Figure 8 is an end view of the seals of Figure 6, but in yet another position.

Figure 9 is a top view similar to that of Figure 4, but showing the door in its closed position.